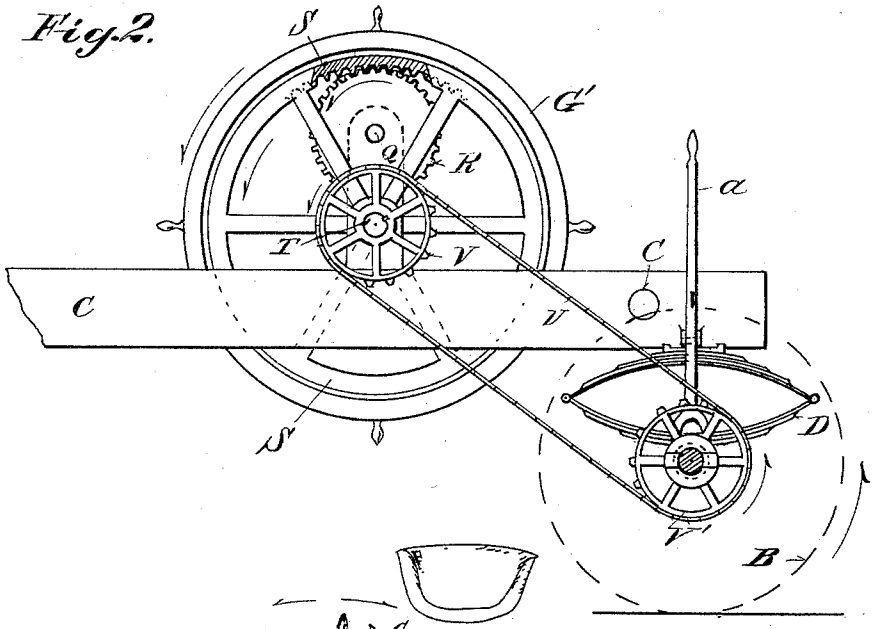
(No Model.) 2 Sheets—Sheet 1.

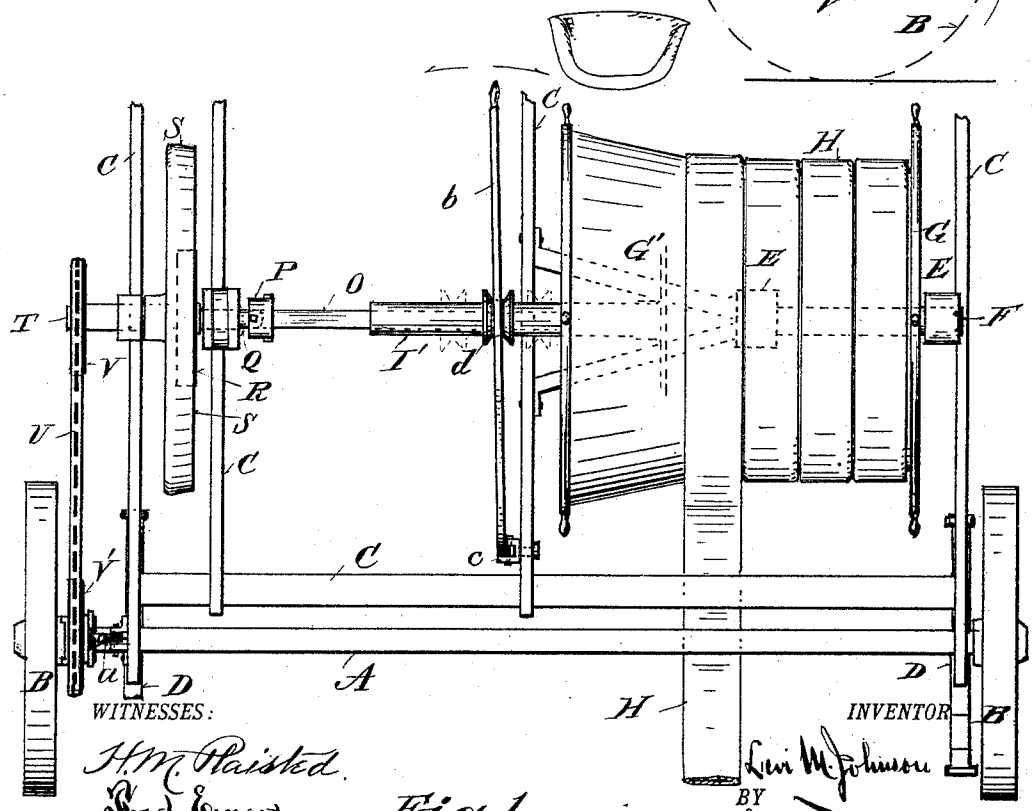
L. M. JOHNSON.

HOSE CARRIAGE.

No. 497,882. Patented May 23, 1893.

Fig. 2.





WITNESSES:

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Fred Ernest

Fig. 1.

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HIS ATTORNEY.

(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

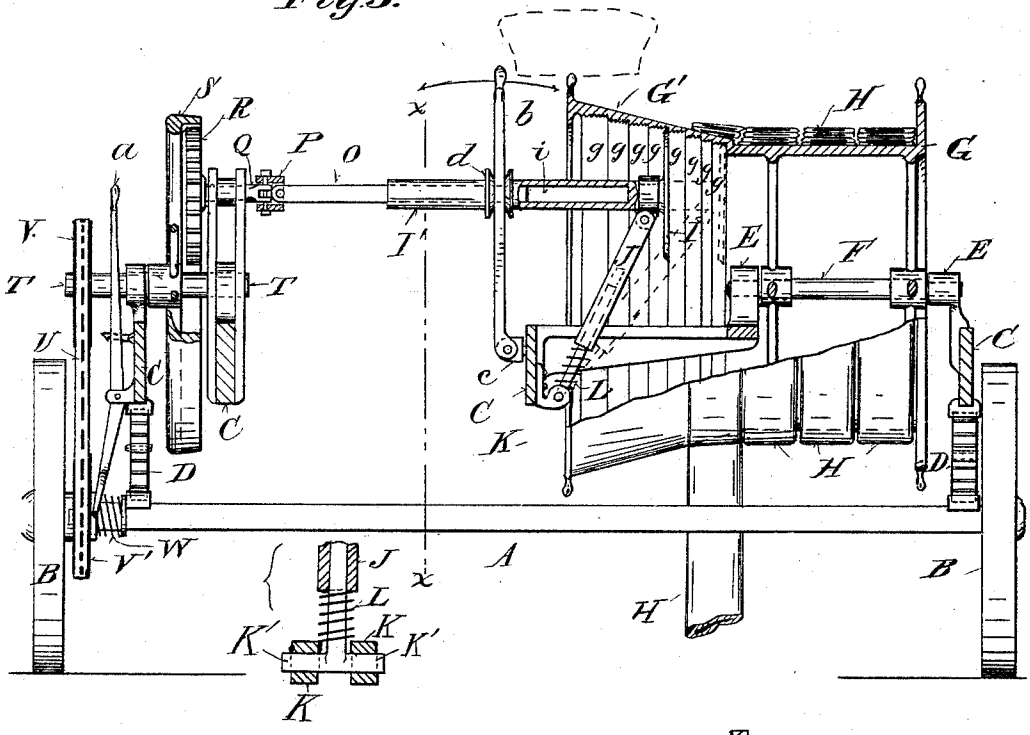

Fig. 4.

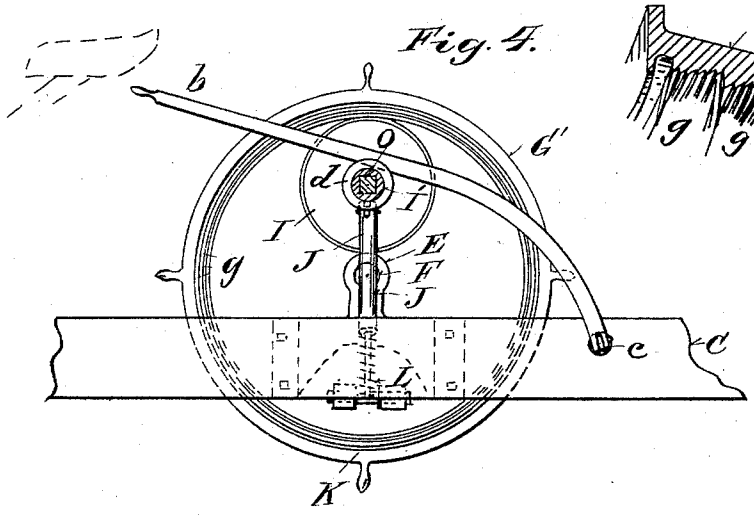

Fig. 5.

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UNITED STATES PATENT OFFICE.

LEVI M. JOHNSON, OF HILLSBOROUGH, OHIO.

HOSE-CARRIAGE.

SPECIFICATION forming part of Letters Patent No. 497,882, dated May 23, 1893.

Application filed September 2, 1892. Serial No. 444,889. (No model.)

To all whom it may concern:

Be it known that I, LEVI M. JOHNSON, a citizen of the United States, residing at Hillsborough, in the county of Highland and State of Ohio, have invented certain new and useful Improvements in Hose-Carriages, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to certain new and useful improvements in hose carriages, being particularly adapted for fire hose carriages.

The object of my invention is to provide means for winding up the hose upon the drum or reel of a hose carriage during the travel of the carriage, and to effect the automatic slowing down of the reel as the hose is wound thereon, and the diameter of the winding surface increased.

To this end my improvements have reference to a friction driving mechanism for the reel or drum; have reference to spring-actuated engaging mechanism, and a friction disk; have reference to a reel or drum in connection with a consecutive spiral path of travel for said friction disk, the diameter of the spiral path, increasing according to the diameter of the winding surface, as the hose is wound; have reference to a stepped spiral path, interiorly located on a reel or drum; and have reference to other points hereinafter fully described and claimed.

The chief characteristic of my invention is the slowing down of a drum or reel on which the hose is being wound, so that, as the diameter of the winding surface increases by the additional layers of hose on the reel, and the length of hose wound up by one revolution correspondingly increases, the reel will diminish its rotative speed, and thereby preserve the same winding speed at the surface of the reel, and wind up the hose lying on the ground as fast as, and no faster than, the reel carriage travels back along the line of hose. Other peculiarities of my invention will hereinafter appear.

In the accompanying drawings on which like reference letters indicate corresponding parts: Figure 1, represents a plan view of the rear end of a hose carriage and my improvements applied thereto; Fig. 2, an elevation of the left side of the same, the left wheel being removed; Fig. 3, an end view and partial section of the machine, parts being broken away to show the construction; Fig. 4, a cross section on the line *x x* of Fig. 3, looking to the right; and Fig. 5, an enlarged detail view of the stepped cone of the wheel and a portion of the friction disk.

The letter A designates the reel axle of a hose carriage on which are rotatably mounted the carrying wheels B. A frame work of suitable longitudinal and cross bars C, is supported by bearings D, in the usual manner. Upon this frame work is mounted, in bracket bearings E, a reel or drum-shaft F, supporting a reel G, on which is wound the hose H. The drum or reel is cone shaped at G′, and cylindrical the remaining portion of its length. On the interior of the cone-shaped portion is formed a continuous path, preferably upon steps *g*. The path is thus a spiral increasing in diameter by steps; or in other words the path is formed on the interior of cylinders of different diameters. The difference between these diameters corresponds with the thickness of the hose wound upon the reel. That is to say, a hose that when wound upon the reel increases the size a half an inch with every layer, will be used in connection with a step of half an inch. The path is preferably V-shaped with its perpendicular face outward, as shown in Figs. 3 and 5, and adapted to receive a friction disk I, having a matching edge to rotatively engage with the stepped cone as it is rotated by means presently to be described. The cone formed by these steps of different diameters, also varies in length axially according to the number of widths of hose wound on the reel. For instance, the first and the smallest step may have three coils of the path, corresponding to three widths of hose wound upon the reel portion G; the next step may have three coils, likewise corresponding with the three widths laid upon the first layer; the next layer of hose may be laid in four widths, extending outward upon the portion G′ of the reel, and the next step of the cone will therefore have four coils or threads of the path formed thereon; and so on till the limit of the cone and the reel is reached. The reel being driven by the friction disk, (as will presently be described) will rotate slower and slower, as the disk travels farther and farther away from the smaller

end, and successively from step to step till the larger end is reached. The points where the disks change from one step to the next, are opposite each other on the cone, as indicated in Fig. 5. The perpendicular face of the thread or path, impinges on the side of the friction disk I, and forces it outward as the drum rotates. The disk is kept in engagement with the drum by a spring-actuated brace J, one end of which is provided with a stem slidingly mounted in it and having trunnions K′ mounted in bearings K, secured to the frame, and having a spring L coiled thereon; the other end of the brace J is pivoted to a collar M embracing a shaft I′ carrying the disk I. A square socket *i* is formed in said shaft in which is slidingly mounted a square shaft O, so as to rotate the shaft I′ and disk I, while allowing the axial sliding required by the travel of the disk outward and inward within the reel. A universal joint is formed by a collar P, to which the outer end of the shaft O and the matching end of a driving shaft Q, are pivoted as shown in Figs. 1 and 3. The driving shaft Q is mounted in suitable bearings carried by the frame, and has a spur gear R interiorly meshing with the driving gear S, carried on a main shaft T, driven by a sprocket chain U, connecting sprockets V and V′, carried by the shafts T and A, respectively. A clutch connection between the sprocket V′ and the carrying wheel B, is maintained by a spring W, Fig. 3, and disengaged by a handle *a* when desired to stop the driving mechanism.

In order that the hose on the ground may be wound up as fast as, and no faster than, the carriage travels along the line, I form the sprockets V and V′ of the same diameter, and the gear S of the same pitch diameter as the carrying wheel B, so as to give it the same speed; then the gear R and the disk I, being likewise of one diameter, will travel at the same rate at their periphery; the friction disk, thus traveling at the same rate as the carrying wheel B, will communicate the same peripheral speed to the cone reel, and thus wind up the hose thereon as fast as, and no faster than, the same is lifted from the ground. There will thus be no slack or tightness of the line of hose, but it will be reeled up uniformly and evenly and automatically, by the form of mechanism above described. I wish to be understood, however, that I do not limit myself to the exact construction and arrangement of parts, sizes, or detail, hereinbefore shown and described, but lay broad claim to the means for effecting the above mentioned result and object aimed at in this invention.

In order to shift the friction disk to different steps of the cone, as will be required in the operation of the reel, I provide a lever *b*, pivoted at *c*, so that it may be brought down upon a grooved collar *d*, on the shaft I′, and move the shaft in and out of the reel. A pressure downward will depress the spring-actuated brace J, thus taking the disk out of its grooved path; it may thus be adjusted inward or outward, and the brace will throw it into contact with the cone when the lever B is released.

In the operation of the reel, when the hose is wound thereon, the lever *a*, will free the clutch from the driving wheel B and the lever *b*, will allow the reel itself to revolve freely as the hose is run off. When the hose is to be wound on the reel, the end is secured thereon in the usual manner, the friction disk is forced inward to engagement with the smallest step of the cone, corresponding with the diameter of the reel portion G, and, the clutch sprocket V being engaged with the driving wheel B, the travel of the carriage will wind the hose on the reel as before described.

If the hose be not completely reeled off, and it be desired to wind it up again, the friction disk is not adjusted to the innermost and smallest step, but to the step corresponding with the diameter of the wound up hose. For instance, if the hose be reeled off so that but four layers remain, as shown in Fig. 3, the disk I is adjusted to the fifth step corresponding with the diameter on which the fifth layer is to be wound. The succeeding layers will be wound up as the disk travels the remainder of its path on the larger diameters of the cone. When the disk reaches the end of the last step it will travel around in the outer groove next to the larger step, till the clutch sprocket V′ be thrown out of engagement by operating the lever *a*, which stops the connecting mechanism between the driving wheel B and the disk.

It sometimes happens that a section or strip of hose will be interposed, in a line of hose, of larger size or diameter than the line generally. In such a case it is obvious that the diameter of the winding surface will increase more rapidly than the diameter of the spiral path where the friction disk works. To compensate for this the operator, in practice, disengages the driving mechanism so as to arrest the rotation of the drum till such time as the continued advance of the vehicle shall have caused some slack or surplus of unwound hose, having traveled over so much hose without winding it. This done he throws the operating mechanism again into operative position and resumes the rotation of the drum and thereby takes up the slack so obtained. This slack will be quickly taken up by reason of the rapidly increasing winding surface, due to the abnormal or unusual size of such strip of hose. Having passed beyond such strip the usual operation, hereinbefore described, is resumed and the manipulations become merely automatic.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a hose carriage, the combination with a suitable framework and carrying wheels, of a rotatable reel or drum mounted thereon, provided with a spiral path gradually increas-

ing in diameter of the spiral, corresponding to the layers of hose wound on the reel, an operating device traveling in said path and intermediate connections between said disk and the carrying wheels to effect the rotation of the former.

2. In a hose carriage, the combination with a suitable framework and carrying wheels therefor, of a rotatable reel having a series of annular steps formed thereon, corresponding to the thickness of hose to be wound on said reel, a friction disk adapted to engage with said steps to travel thereon, and means to rotate said disk at a speed corresponding to the travel of the carriage on the ground.

3. In a hose carriage, the combination with a suitable framework and carrying wheels, of a rotatable reel mounted thereon and having a series of steps of increasing diameters, corresponding with the thickness of the hose to be wound thereon, and each step provided with a spiral path or thread formed therein for the purpose described, a friction disk adapted to travel in said path or thread, and operative mechanism between said disk and carrying wheels, to effect the rotation of the reel.

4. In a hose carriage, the combination with a framework and carrying wheels, of a reel rotatively mounted thereon, provided with a flaring cone portion provided with interior steps of different diameters and widths, and a rotatable driving piece adapted to travel on said stepped cone, at a speed corresponding with the travel of the carriage on the ground.

5. In a hose carriage, the combination with a frame work and carrying wheels, of a rotatable reel having a series of stepped rings of different diameters and widths, according to the thickness and width of hose to be wound on the reel, and provided with a spiral, grooved path, formed in a continuous line upon said steps, a friction disk adapted to travel in said grooved path and rotate the reel, connecting mechanism operatively connecting said disk with a carrying wheel, a spring-actuated device for maintaining the engagement of the disk and reel, and a lever for disengaging said disk and reel, and adjusting the disk to different steps.

6. In a hose carriage, the combination with a carrying frame, of a rotatable reel mounted thereon, provided with a spiral path of varying diameter according to the thickness of hose used, a friction disk traveling on said cone, a spring-actuated brace to maintain the disk in engagement with the cone, a lever to disengage the disk and cone and adjust it in and out, a shaft for said disk having an angular socket, and a matching shaft slidingly mounted in said socket to allow of the adjustment of said disk, and means to rotate said shaft.

7. In a hose carriage, the combination with a carrying frame, of a rotatable reel mounted on said frame work, a portion of the reel being flared outward and provided with a continuous grooved path, thus constituting a spiral of varying diameter, a friction disk matching said path to rotate the reel, a hollow shaft for said disk, a matching shaft slidingly mounted in said disk shaft to rotate the latter, intergearing mechanism between a carrying wheel and said inner shaft to effect the rotation of the latter, and a universal joint between said mechanism and said inner shaft to allow the axial travel of the disk, and its varying distance from the axis of the reel during said travel.

8. In a hose carriage, the combination with a frame work and carrying wheels, of a rotatable reel mounted on said frame work and provided with a series of steps of different diameters, each step being distinct in itself and corresponding with a layer of hose wound on the reel, a driving gear wheel operatively connected to a carrying wheel to be rotated at the same speed, a pinion meshing therewith, a pinion shaft, a friction device adjustably connected to said pinion shaft to be rotated thereby while traveling on said steps of the reel, for the purpose described.

9. In a hose carriage, the combination with a rotatable reel, of a stepped cone having a grooved path on said steps, and a matching friction disk adapted to travel in said path and drive the reel, substantially as and for the purpose described.

10. In a hose carriage, the combination with a rotatable reel having a spiral path thereon, of a friction disk adapted to travel in said path, a shaft for said disk, a collar forming a bearing for said shaft, a spring-actuated brace connected to said collar to maintain the engagement of the disk and reel, and means to rotate said disk shaft.

11. The hereindescribed adjusting and supporting mechanism for a friction disk, the same consisting in a shaft for the disk, having an angular socket, a matching shaft slidingly mounted in said socket at one end and provided with a universal joint at the other end, a collar supporting the disk end of the hollow shaft and forming a bearing therefor, a spring-actuated brace connected to said collar and constituting a yielding support therefor, and means to depress and axially adjust said disk shaft, for the purpose described.

12. The combination with a friction disk and an extensible shaft therefor, a universal joint at one end of said shaft, and a yielding support at the other end, of adjusting mechanism consisting of a universal joint, and pivoted lever adapted to engage with said pinion shaft and depress the yielding bearing end thereof, and to adjust the said shaft axially to vary the position of the disk.

13. The combination with a friction disk and a hollow shaft therefor provided with a rectangular socket, of a matching shaft slidingly mounted in said socket, driving means therefor, a universal joint between said driving means and the outward end of said shaft, a yielding bearing near said friction disk op-

posite the universal joint, a driving member for said disk, and means to adjust the disk shaft axially, and away from the driven member.

14. The combination with a friction disk and its shaft, of a collar-bearing for one end of said shaft, a hollow shaft pivoted to said collar-bearing, a matching piece mounted therein having trunnions on one end and adapted to slide in said hollow shaft, a bearing for said trunnion end, and a spring between said trunnion and hollow shaft to effect a yielding support for the collar-bearing.

In testimony whereof I affix my signature in presence of two witnesses.

LEVI M. JOHNSON.

Witnesses:
OLIVER H. MILLER,
WARREN M. MCNAIR.